Design of Learner-Centered constructivism based Learning Process

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Abstract— **A Learner-centered learning is constructivism based and Competence directed. We define general competencies, domain competencies and specific course competencies. Constructivism based learning activities are based on constructivism theory. For each course module the intended learning level will be defined. A model is built for the design of a learner centered constructivism based and competency directed learning process. The application of it in two courses are presented.**

Key words: **Constructivism based learning, Learner centered learning, Course development, Collaborative learning, Competencies based learning.**

I. INTRODUCTION: LEARNER CENTERED TEACHING

In the past the good learner was the one who could memorize more information about a certain subject. Nowadays, the good learner is the one who knows how to reach the information, how to expand it, and how to apply it in real life cases [9]. Nowadays learners do no more accept a passive role in the learning process and they ask for a more personalized way of learner-centered learning, fitting their personal learning requirements.

The learner wants to have a central role in the learning process. They are deciding on their personal learning strategy, specifying the subjects of learning and deciding on how they wish to see the organization of the learning process, being full online or being organized as a blended learning process. [10]

In the teacher-centered teaching method the focus of teaching was on the delivery of the content by the teacher as defined in a curriculum commission fitting pre-defined objectives of the study program or domain specific competences. The individual learner was a passive listener and was not actively involved. The curriculum did not link up with the individual learners' preferences. The instructor determined the content of the course and was organizing it. The learners were recipients of the instructor's knowledge and their organization of the learning process[6].

We see a shift of the focus from the teacher to the learners.

In learner centered learning, learners' needs, preferences, learning styles, skills and experience are taken into consideration in the learning process.

II. LEARNING CHARACTERISTICS

A. Competency Based Teaching

Learner-centered teaching starts from a set of pre-set competencies to be achieved by the learner at the end of the learning process. A learner is competent if he is able to display relevant skills and knowledge in order to solve a (even poorly defined) problem.

The required skills, the knowledge and the attitudes that the learners should have at the end have to be described as the required competences. We can differentiate between three types of competencies: general competencies and general academic/ scientific competencies, domain specific knowledge competencies and course specific competencies.. General competencies in higher education are connected with future professional environment and are about critical reflection, creativity, basic management tasks (if education program is in management), communication skills and orientation towards life-long learning. General academic competencies are about research attitude, research methodology, explorative research, multidisciplinary teamwork. Scientific domain specific competencies are about the relevant learning content topics of that domain.

B. Constructivism based learning

In Koohang et al [2], constructivism learning theory is defined as active construction of new knowledge, based on learner's prior experience".

Following Loyens [12] the concept of constructivist learning can be structured in 4 core features: knowledge construction, cooperative learning, self-regulated learning and using realworld or business problems. Knowledge construction is the core element of Constructivism theory, in which learners interpret new information using knowledge and experience they already have. Cooperative learning is essential for knowledge construction and sharing, in which learners, teachers, and business people contribute to the construction of knowledge through social interactions. Self-regulation which includes setting learning objectives, self-

observation, self-assessment, and self-reinforcement, is believed that it has a great influence on learning outcomes and learners' performance. Finally, in constructivism learning, learning process has to include real life situations. Problem solving develops critical thinking skills and prepares the learners for professional work environment [10]. Project based learning is a good example. In project based learning learners' interaction and cooperation will increase and will result in new knowledge construction and in sharing it with other learners. Learners are encouraged to engage effectively in the organized learning activities. They will explore, discuss, negotiate, collaborate, cooperate, investigate, and solve real life problems in social learning environment. They will interact with the environment (physical and social world), to develop social and interpersonal skills and knowledge.

Teacher's role is essential and important in the learning process. A teacher is a facilitator and guide, and not a director or a dictator. He will facilitate learning activities [7]. The constructivist teachers' role is to create a context where the learner is motivated to learn; which includes providing content and resources and organizing constructivist learning activities.

C. Intended learning level for the course modules

Constructivist learning process in any subject area can range from very simple to sophisticated and complex, depending on the objectives of the teacher about the intended learning level that the learner should achieve in that subject area. [3]

The intended learning level can be low, being only the level of "to know, to be informed", corresponding with a traditional teaching session plus an assessment, or it can reach to one of the following higher levels: "to understand and create personal insight", "to understand the application of the knowledge in relevant practice", "to extend the knowledge by searching for new one", "to analyze new knowledge to reflect and to create new insight", and/or "to apply the knowledge and generalize new alternatives in new domain". Depending on the intended learning level, the constructivist learning process of a course module will be composed of a limited or more extended number of learning activities. Dependent on the intended learning level we follow a short or a long trajectory.

III. LEARNING PROCESS DEVELOPMENT

The learning process development process starts from the defined specific course competences and course content. The course content will be structured as a set of course modules each devoting to a course topic. For each module the intended learning level will be defined. This can be different for each module and so will be the learning activities to realize that learning level. If f.e. is set forward that the learning will be informed and that he will become knowledgeable about the topic, than the learning process for that module can be limited to a traditional classroom session.

Though for a more important topic, that needs a higher level of learning, the learning process will include a more active participation of the learner and even it will be organized as a real constructivism based learning process consisting of several constructivist learning activities.

A. Learner-centered Learning Process Development Model

Curriculum development means that a curriculum development committee is deciding about which content (and courses) will be included in the study program On study program level the program specific competencies (also called outcomes, learning objectives) and the general competencies, including the professional ones will have to be defined.

Teachers have on course level to define the course specific competencies (outcomes: learning objectives) and linked with it the content of the course. In the development of the learning process of the course, the requirements as formulated on study program and on course level, have to be taken into account. For each of the modules the intended learning level will be defined. In the learning activities some learner-centered and constructivism elements have to be integrated. These are based on **Learner-centered, constructivism based learning model** [2]. In our research we developed a model for the development of the **Constructivism Based Learner-centered Development of the Learning Process.** We see the integration of competence base learning and constructivism based learning in this model. (See Figure 1)

IV. CASE: DEVELOPMENT OF CONSTRUCTIVIST LEARNING PROCESS AT HASSELT UNIVERSITY

A. A course on bachelor level: Business Information Systems

This course is a 2nd year bachelor course in the study program BI (Business Informatics). Based on the domain specific competencies, the general competencies as defined in the faculty for this study program bachelor in Business Informatics, the course specific competencies and the course content were developed. The content is structured in 5 modules and for each module the intended learning level is defined. All modules are scheduled in the timeframe of a semester (if a semester course). For each of these modules, a sub-learning process and learning activities are built. We differentiated already between the following 6 intended learning levels:

L1: to know, to be informed
L2: to understand and to create personal insight
L3: to understand the application of the knowledge
L4: to extend the knowledge by searching for new one
L5: to analyze new knowledge to reflect and to create new insights.
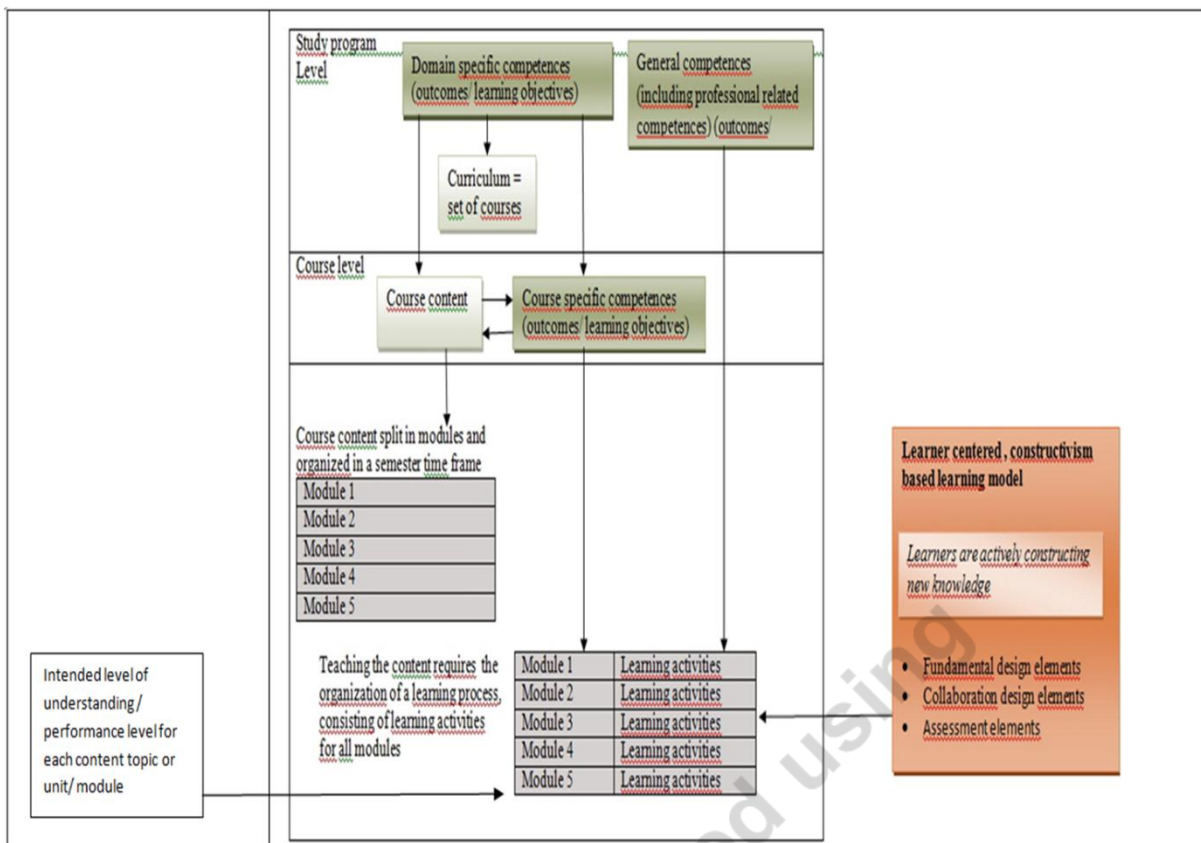L6: to apply the knowledge and generalize new alternatives.

Figure 1. Learner-centered Constructivism Based Learning Process Development Model

In this bachelor course the content delivery is spread over the semester. For some of the modules a higher intended level of learning is set forward. In module 1 and 5, we opted for a short learning trajectory and set forward a level L1. In module 4 we go for a longer trajectory and set forward a level L5. (See Figure 2)

B. The master level course e-business strategy

This course is a master course in the BI(Business Informatics) study program.

The domain specific competences and the course specific competences have been developed, and the content of the course e-business strategy is determined. The content based on the used textbook covers 8 chapters.

1. Modular structure and intended learning level

Because it is a master course, we are limiting the number of modules by combining the content topics. The theoretical chapters of the textbook were introduced during 5 classroom sessions in the two first weeks. Than the topic e-learning is selected for deeper study. A very high level of learning level (L6) is set forward for the topic. .and a project based approach is chosen. For that project we need more time.

2. Learning process

In this course one course topic has been selected to develop a project in co-operation with a Bank . The e-learning adoption problem of the bank was presented by management of the Bank. Management took part in the project team. A survey covering the adoption indicators was developed based on the theory built up in advance based on a literature study. The organization of the survey was the responsibility of KBC and the learners analyzed the results. Learner teams formulated their advise for KBC management on point of required improvements in their e-learning organization. (See Figure 3)

3. Project plan

In the project plan it is clear that the planning must fit the limited timeframe of the semester. It means that that no delays were permitted. On that point the learners had no freedom. (See Figure 4)

V.CONCLUSIONS

Learner centered learning is defined and linked with competences directed learning and with the constructivism based learning concept.

For the learning course modules the intended learning level were defined. In the developed model for the development of the learning process, the different concepts were integrated. The model has been applied to two courses of Hasselt University.

In the bachelor course more time is spent at teaching of the 5 content modules and scheduled them spread over the semester That is the reason why the intended learning level of the modules cannot be the highest one. In the master course we concentrated the teaching sessions in the first weeks and started afterwards a business project in which the learner teams had the experience of a real business problem.

The learners joined the KBC management in the project management team and split the tasks and formulated an advice for KBC management about the required improvements of their e-learning organization. In both learning processes the constructivist learning characteristics and the required general competences were implemented in the learning activities. In that project based approach the interaction with the business environment and the connection with their future professional environment were main objectives.

Module	Week	Course Content	Intended Level of Learning	Learning activity	Constructivism characteristics	General competencies
1	1	Enterprise IS	L1: to know, to be informed	Classroom teaching		
				Self test	Self assessment	
2	2	e-business and e-commerce	L4: extend knowledge by searching new	Classroom teaching		
				Self-test	Self assessment	
	3			Adoption of e-business : study of the websites of companies + discussion and conclusions	-exploration -embedded learning in a realistic context	Attention to the practical relevance of what one learns
	4			Select as a team 1 topic of the course, find additional info(at least 3 scientific articles in e-library)	Expand and go beyond what is learnt	adopt a research attitude
	5			Write a paper to report and share the new knowledge		write a scientific report
3	6	KM & management support systems	L3: understand application in relevant practice	Classroom teaching		
				Self-test	Self assessment	
	7	KM & management support systems		Self-study tutorial	Responsibility	the ability to work goal-oriented
	8	KM & management support systems		Computer practice in lab: access + link Excel	-Problem solving -application of knowledge	
	9	KM & management support systems		Computer practice in lab: Excel DSS	-Problem solving - application of knowledge	Problem solving
4	10	Security management	L5: analyze new info, reflect and create new insights	Classroom teaching		
				Self-test	Self assessment	
	11			Team-task: interview in company, using a predefined questionnaire	Real world situation	Communicate effectively and respectfully
	12			Discussion about the results of the survey (all data combined in one file)	reflexion	Search info, analyze, interpret and report
				Preparing a team paper : make a study to compare "our" results with the published result bij CSI based on a survey in USA.	reflexion	Search info, analyze, interpret and report
5	13	Building and re-engineering IS	L1: to know, to be informed	Classroom teaching		
				Self-test	Self assessment	
		Individual written exam			assessment of individ learning	

Figure 2. Constructivism based Learning Process of the Course Business Information Systems

Module	No. of Week	Course Content	Intended Learning Level	Activities
1	3 Weeks	Theory of e-Business Strategy	L2: To understand and to create personal insights	5 Classroom sessions concentrated in the first 2 weeks
				Self-study & self-assessment
				Chat session
	2 Weeks			Study and individual exam in last 2 weeks
2	2 Weeks	Topic e-learning, and more specific: measuring the e-learning readiness of an organization	L2: To understand and to create personal insights	Reading of articles about e-learning & e-learning readiness
				Teamwork: search for articles about e-readiness
				Preparing a list of indicators & presentation to share knowledge with peers and with KBC management
3	8 Weeks	Project: e-learning readiness of KBC	L6: To apply knowledge and generalize new alternatives in a new domain	See project planning in next figure

Figure 3. Constructivist learning process of the course e-business strategy

Project Planning	Responsible	Assignment	Meeting	Schedule/Deadline
Development of measurement instrument for e-learning readiness				
Proposed list of indicators online	Project management			28 Oct.
Final set of indicators online	Stud-management		Discussion forum	Between 28 Oct & 2 Nov.
Development of a computer program in Excel to analyze the results of the survey				
Definition of the requirement of the system	Project mgmt & Stud-BI		27 Oct 1:30 pm KBC	
Development of the program	Stud BI			Between 1 Nov & 1 Dec
Intermediate reporting	Project mgmt & Stud-BI		10 Nov 9:00 am KBC	
Searching for best practices of e-learning implementations	Stud-management	Ass-3		Before 29 Nov 5:00 pm
Survey: setup & organization				
Formulation of questions by students	Stud-management	Ass-2		Before 9 Nov
Formulation of the questions: Final	Project mgmt		10 Nov	
Questionnaire online, sending mails and answers receiving	KBC			Between 10 Nov and 6 Dec
Creation of Excel file with answers	KBC			8 Dec
Analysis of results and reporting				
Analysis of survey results and report	Stud-BI			Before 12 Dec
Presentation of conclusions and advises to improve: ppt	Student teams	Ass 4		Before 20 Dec 5:00 pm
Presentation for management KBC			22 Dec Uhasselt	
Report: student teams write a paper	Student teams	Ass 5		Exam January

Figure 4. Project planning project e-business strategy

REFERENCES

[1] Ahmad Al-Huneidi (2011), "Constructivism Based Blended Learning in Higher Education". Master thesis, Hasselt University, Belgium, available on: http://hdl.handle.net/1942/12273

[2] A.Koohang, L.Riley, T.Smith and J.Schreurs (2009), "E-learning and constructivism: from theory to application". Interdisciplinary Journal of e-learning and learning objects (IJELLO), 5. p. 91-109. In: Auer, Michael & Schreurs, Jeanne (Ed.) Academic and corporate e-learning in a global context. p. 865-874

[3] C.Tang, J.Biggs: Applying Constructive alignment to teaching learning and assessment.

[4] G.C. Burrill, "Competency-based curriculum development: an experimental model for social service workers. "; in Innovative Higher Education; Vol 1 nr 2, pages 132-138.

[5] Ola Sabbagh and Ghonah Hamwyah (2010), " Fresh ideas in learner-centered instruction, Telling ELT Tales out of School, Procedia Social and Behavioral Sciences 3 (2010) 213-215, Aleppo University, Aleppo, Syria.

[6] Rutkauksiene, Danguole; SCHREURS, Jeanne; Huet, Isabel & Gudoniene, Daina (2010) Train the teachers in learner centered learning and teaching.

[7] Schuman, L. Perspectives on instruction. (1996). Retrieved July 05, 2010 from http://edweb.sdsu.edu/courses/edtec540/Perspectives/Perspectives.html

[8] Weimer, M. (2002). "Learner-centered teaching: five key changes to practice". San Francisco, CA: Jossey-Bass.

[9] Yucel GELISLI (2009), "The effect of learner centered instructional approaches on learner success", World Conference on Educational Sciences 2009, Department of educational sciences, Gazi University, Ankara, 06500, Turkey.

[10] Sofie Loyens, David Gijbels (2008), "Understanding the effects of constructivist learning environments: introducing a multi-directional approach", Instructional Science (2008) 36: 351-357.

[11] M.J.Hannafin, S.M.Land, (1997), "The foundations and assumptions of technology-enhanced student-centered learning environments", Instructional Science 25, (1997), 167-202.

[12] S.Loynes, R.Rikers, H.Schmidt (2008); "Relationships between students' conceptions of constructivist learning and their regulation and processing strategies"; Instructional Science (2008) 36; 445-462.